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Atrophic tongue associated with *Candida*

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BACKGROUND: Traditionally, total atrophic tongue has been due to nutritional deficiencies, such as vitamin B12, folic acid, or iron deficiencies, and partial atrophic tongue has been well known as median rhomboid glossitis or geographic tongue. The other cause of atrophic tongue is oral candidiasis.

METHODS: Forty patients with atrophic change of the tongue were examined on a relation to candidiasis. All of them complained of tongue pain on spicy or hot diet. Laboratory examinations included blood examination for diabetes and anemia, culture test and direct cytologic examination. The intensity of tongue pain was evaluated pre- and post-treatment using visual analogue scale (VAS).

RESULTS: Twenty-four of 40 (60%) had pre-disposing factors of candidiasis including diabetes mellitus, malignancy, systemic steroid therapy, long-term antibiotic therapy and others in their medical history. Blood examinations revealed mild anemia and/or Fe deficiency in 5 (12.5%), mild diabetes in 4 (10.0%), both in two, while residual 29 patients (72.5%) were within reference levels. In the culture examination, candidal species were isolated in 72.5%, and almost all of them were *candida albicans*. The direct cytologic examination performed in 17 of 40 patients, witch revealed pseudohyphae of fungi in 14 patients (82.4%). After the antifungal treatment, the tongue pain disappeared or improved markedly in 80%. Simultaneously, the regenerative tendency of filifolm papilla of the tongue dorsum was observed in these patients.

CONCLUSION: Atrophic tongue associated with pain at eating, even though it is mild atrophic change, has a high probability of being a *candida*-induced lesion. Long disease duration and no benefit by topical steroids are suggestive and diagnostic factors of this disease.

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Introduction

Atrophic tongue or smooth tongue results from atrophy of the filiform papillae, which is well known to due to nutritional deficiencies such as vitamin B12, folic acid, or iron deficiencies. Etiological factors of these conditions include not only nutritional deficiencies, but also diabetes, xerostomia and candidiasis (1). Traditionally, oral candidiasis has been classified into acute pseudomembranous (thrush), acute atrophic, chronic atrophic and chronic hyperplastic forms. Atrophic glossitis is well known as acute atrophic candidasis or *candida* glossitis, which is commonly associated with the use of broad-spectrum antibiotics and topical or inhaled corticosteroid preparation (2). It is also one of the most common oral findings in HIV-infected patients (3). However, atrophic candidiasis is not always acute but may last for many months. Further more, it may occur in the individual who has no distinct pre-disposing factors for *Candida* infection.

In the present study, we investigate the role of *Candida* species in atrophic tongue.

Patients and methods

The present study includes consecutive 40 patients with atrophic tongue, who were referred to our department with the chief complaint of tongue pain on spicy or hot diet between January 2002 and March 2004. The patients, who did not feel tongue pain at the time of eating, were excluded. For each patient the age at presentation, gender, duration of the symptom (tongue pain), other symptoms and signs, complete medical history and prior treatment or medications for the symptom were obtained. Laboratory tests for diabetes and anemia included blood sugar; Hb, Fe, vitamin B12, and folic acid were performed. For mycological examination, the samples were collected with scratch on the site of painful tongue surface. These were incubated on Sabouraud's agar medium at 35 °C for 3 days. In addition, the direct cytologic examination was performed with the same samples in 17 of 40 patients (Cyto Quick staining system, Mutou Chemical Co., Tokyo). Pseudohyphae contained within exfoliated epithelial cells constituted a positive cytologic finding of candidiasis.

The treatment was miconazol gel 25 mg four times per day. Patients were instructed to drop the gel onto the tongue, spread whole mouth and hold for at least 10 min, and then to swallow. The antifungal treatment continued at least for 2 weeks. The intensity of tongue pain was evaluated using visual analogue scale (VAS) from 0 to 100 (no pain to extreme pain).

Results

Clinical features

The patients were six men and 34 women (median age: 70 years; mean age: 67.4 ± 12.6 years; range: 27–83-year old). The clinical examination revealed varying degrees of atrophic change (from slight redness to smooth and red or magenta) of the total or partial tongue dorsum in all 40 patients. The reported average duration of the chief complaint was 6.43 ± 5.18 months (median: 3 months; range: 0.75–36 months) (Table 1). Other symptoms or signs except tongue pain were presented in 15 (37.5%); dry mouth in five, angular cheilitis in six, angular cheilitis with dry mouth in two, and stomatitis of buccal mucosa in two. Eighteen of 40 (45%) had partial or complete removal prosthesis. Twenty-one of 40 (52.5%) had received prior treatments for chief complaints at other clinics including topical steroids in nine, gargle with providon iodine in six, topical steroids and vitamin B complex in four, and topical steroids and gargle in two, which failed to resolve their symptoms (Table 2). Twenty-four of 40 (60%) had pre-disposing factors for candidiasis including diabetes mellitus in five, malignancy in five, systemic steroid therapy in four, long-term antibiotic therapy in two, and others. But, the other 16 had no such factors (Table 3).

Laboratory tests

Blood examinations revealed mild anemia and/or Fe deficiency in 5 (12.5%), mild diabetes in 4 (10.0%), both in two, while residual 29 patients (72.5%) were within reference levels. In the culture examination, candidal species were isolated in 29 patients (72.5%), and almost of them were *candida albicans* (Table 4). Fourteen of 17 (82.4%) revealed pseudohyphae of fungi in the direct cytologic examination (Fig. 1). These positive 14 patients included four patients of negative culture examination.

Outcome of antifungal treatment

Two to four weeks after the antifungal treatment, the tongue pain at eating disappeared or improved markedly in 32 (80%). At the same time their other symptoms or signs were improved. The regenerative tendency of filifolm papilla of the tongue dorsum was seen simulta-

Table 1 Details of 40 patients

Gender		*Age (years)*		*Atrophic region of the tongue*		*Disease duration (months)*	
Female	*Male*	*Mean*	*Range*	*Total*	*Partial*[a]	*Mean*	*Range*
34	6	67.4 ± 12.6	27–83	21	19	6.43 ± 5.18	0.75–36

[a]Not included median rhomboid glossitis.

Table 2 Prior medications for tongue pain

Topical steroids	9
Gargle	6
Topical steroids, vitamin B complex	4
Topical steroids, gargle	2
None	19

Table 3 Pre-disposing factors for candidiasis

Diabetes mellitus	5
Malignancy	5
Systemic steroid therapy	4
Antibiotic therapy	2
Others: hepatitis, pneumonectasis, cerebral embolus, anemia, etc.	8
None	16

Table 4 Culture test

C. albicans	24
C. albicans, C. glabrata	3
C. albicans, C. parapsilosis	1
C. glabrata	1
Negative	11

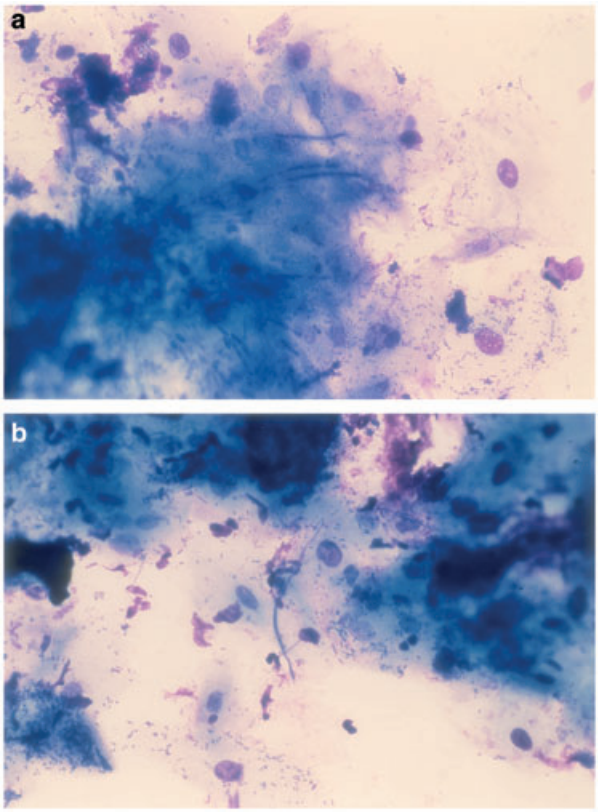

Figure 1 Findings of the direct cytologic examination. (a) Many pseudohyphae of fungi in the total atrophic case. (×400) (b) Some fungal elements in the partial atrophic case. (×400) *C. albicans* were isolated in both cases by the culture examination.

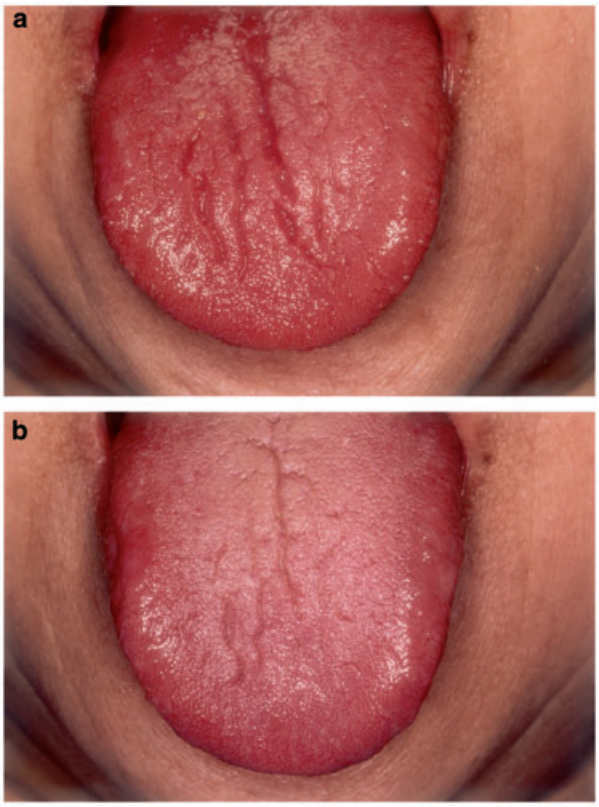

Figure 2 Glossal findings in the total atrophic case (the same case as Fig. 1a). (a) Total atrophic change was seen at pre-treatment. (b) Regeneration of filifolm papilla was seen in two weeks after treatment.

Figure 3 Glossal findings in the partial atrophic case (the same case as Fig. 1b). (a) Partial atrophic change was seen in the left dorsum of the tongue. (b) Regeneration was seen in a week after treatment.

neously in these patients (Figs 2 and 3). Although, 3 of 32 marked response patients had a recurrence of atrophic change with tongue pain 6–12 months after the initial treatment, they were treated successfully with re-antifungal therapy. No change of the symptom at 2 weeks after treatment was obtained in four patients (Table 5).

Table 5 Outcome of antifungal treatment

Improvement of VAS		
$<50\%$	No change	4
$\leq 50\%$	Benefit	4
$\leq 80\%$	Marked benefit	15[a]
Pain disappear	Complete remission	17[b]

[a]Included one recurrence 7 months after treatment.
[b]Included two recurrences 6–12 months after treatment.

Discussion

Atrophic tongue is well known to due to nutritional deficiencies such as vitamin B12, folic acid, or iron deficiencies. Although, 72.5% of patients with atrophic tongue revealed within normal reference level by laboratory blood examinations in the present study. One of etiological factors of these conditions is candidiasis (1). Total atrophic tongue is well known as acute atrophic candidiasis caused by broad-spectrum antibiotics. Etiological factors of partial atrophic tongue such as median rhomboid glossitis or geographic tongue include *Candida* (4, 5). In the present study, patients had not only atrophic tongue but also tongue pain on spicy or hot diet. Functional disorder or functional pain is considered one of important signs of inflammation or infection. Then we performed the culture test for *Candida* and/or the direct cytologic examination, and 72.5% and 82.4% were positive, respectively. Because *Candida* is normally encountered as part of flora in the mouth, its isolation in culture must be supported by direct demonstration of characteristic budding yeast or pseudohyphae in the specimen of the lesion (6). For direct demonstration, preparation of specimens with potassium hydroxide (10% KOH) is the best (6). But we used a quick cytologic staining as a direct examination in this study, and obtained useful direct demonstration. Comparing with the KOH method, merits of this system are the quick staining time (about 20 s) and the ability to observe repeatedly afterwards.

Three-fifth of patients revealed pre-disposing factors such as diabetes mellitus, malignancy and systemic steroid therapy, otherwise two-fifth of patients had no such factors. Our results of antifungal treatment suggested that atrophic tongue associated with pain at eating, even if that was slight atrophic change, was *Candida*-induced lesion with high probability. Usually, it is difficult to diagnose whether the tongue is normal or

not. Clinically, there are no criteria on normal tongue except the doctor's subjective. Our study includes mild atrophic cases whose tongue was almost normal finding at first sight. We only realized that the tongue had been atrophy after comparing both tongues photographs of pre- and post-treatment in such cases. Therefore, the pain at functional time may be more useful in diagnose of *candida*-induced atrophic tongue. Furthermore, long duration of the disease and no benefit by topical steroids were suggestive and diagnostic factors of this disease.

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